

Opinions on the development of theoretical mapping

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Abstract

Cartography is an ancient discipline that has a risen a need to present the major surface of the Earth into manageable sizes. For many years, it was only related to analogue and analogue cartographic maps. Today, cartography includes a wide scope of applications such as digital maps, digital mapping products, alternative forms of visualization (the Earth and many phenomena very small and very large), and analysis of digital geo-spatial data. Modern cartography has two basic components: the theoretical component and applied. Cartography deals with developing a theoretical / conceptual framework that explains the various mapping processes. Because of the methodological point of view, conceptual mapping analysis is very important, fundamental theory mapping is handled by the ICA Commission on Theoretical mapping for many years. So are built different structural models (or their parts) that depict the cartography as a science, an academic discipline, a technology, or natural human impetus. The present paper is a detailed analysis of some theoretical mapping concepts handled by different world ranking cartographers.

The present paper is a detailed analysis of some theoretical mapping concepts handled by different world ranking cartographers, confronted them with Albanian Cartography concepts represented primarily by prof. Agim Shehu.

Keywords: Mapping theoretical cartography, map, concept mapping, cartographic semiotics, cartographic modeling.

1. Introduction

The map is one of the oldest forms of communication. (Rhind,1993). Development of mapping has led to the perfection of the maps and their contents. This development is related to the revolution of cartographic opinion that, as a term has two meanings (Pravda, Schlichtman & olodtschenko, 1994):

- 1) It is a very theoretical opinion on the situation and development of various problems in cartography, as a scientific discipline. It is a generalized cartographic opinion (theoretical), a superstructure on the practice of cartography, therefore, called "theoretical cartography" and
- 2) It is a concrete opinion, based on the confrontation with reality map presented in (or in contrast, in the confrontation of reality with the introduction of its potential on the map).

Theoretical thinking may be partial or total. In the first case, the opinion addresses theoretical mapping in sub branches, e.g., geographic, geological and historical mapping, etc. In the second case the opinion has to do with basic theoretical concepts in cartography, by which; all stages of mapping are guided. Such concepts are related, with the following problem, for example: what is cartography and what are the main functions of the map, the structure of mapping (or atlas, globe geographical contour models, ortophotomap etc.). But in general theoretical opinion included meanings belonging partly to theoretical thinking.

Theoretical Cartography, in the purest sense of the word, finds its expression in the beginning of the XX century in some cartographic works, but its the qualitative and quantitative development that began in 1961 was found by the first International Cartographers' Association (ICA, 1991-1993).

2. Opinions and Concepts In Theoretical Mapping

2.1. Opinions

By the term opinion, theoretical mapping, we mean a new orientation in the development of some fields (branches) of the mapping, or a single branch, i.e. then, when it arises and develops from a certain group of scientists. In cartography, opinions are not narrow and more systems have a hypothetical nature.

Opinions can also be the interpretation of known facts, but have not been verified in all aspects. Many times they are proposals for some ideas on how to solve some problems in cartography. In comparison with theoretical concepts, opinions are less processed, so they have a less longevity.

Genuine theoretical opinions, as a rule, are introduced in concepts, or in

some cases a theoretical concept is as many opinions. Such opinions may include: general cartography, geographic cartography, thematic cartography, cartographic information communication, cartographic automation and geoinformatics, etc. The above examples include sub-branches of cartography, as a means, not as concrete theoretical opinions.

2.2. Concepts

The concept, in theoretical cartography represents an opinion thought structured system. If this system consists of information and knowledge for a particular problem mapping, then the concept is called a **special concept**. If the conceptual knowledge includes all mapping, then it is called a **general concept**. Here are just a few concepts (theory) cartographic opinion developed during the last 30 years, such as: (1) information concept (the concept of map as a carrier of information), (2) communication concept (the concept of cartographic information transmission) , (3) linguistic concept (the concept of map as an expression, by means of the language of the map), (4) system concept (the concept of map as an abstract system in presenting real system geographical sphere, made it two subsystems : natural areas and human spheres), (5) the concept of modeling (cartographic-mathematical modeling), (6) geoinformatic concept (convergence of all the theoretical concepts in the maps), etc..

Information concept, the oldest, was formulated by Shannon, in the 1940s of XX century, according to which the map is only the barrister of information. This concept was accepted by the majority of scientists of different fields, with the exception of many cartographers. We do not support the concept of information, as it is a quite a narrow concept, that does not include the requirements of a wide spectrum of users. Map serves not only to illustrate the objects and phenomena known by us, but also to acquire new knowledge necessary for the fair and accurate numerous scientific and practical tasks.

Map users are not interested in limited tasks solution: where, how (in what way) and what appears on the map, which relate to the identification, localization and interpretation. They will make questions to themselves and clarify a number of other issues, for example, why do these objects operate and where phenomenon is located in the territory given to be mapped, which is their connection with geological and geomorphological structure of the territory, in what extent does the climate affect soils, vegetation, water, etc., which is the result of human activity on nature (and vice versa), what's the connection between them, etc. Such approach is realized by means of logical methods. **In this context, the concept of information differs from contemporary linguistic concept maps, more accurate and**

more complete, which considers as a priority cognitive mapping function.

Communication concept, born in the late 1960s of XX century, is established by some scientists as: Kolançi, Ratajški, Robinson, Freytag etc.. (ICA, 1991-1993) said: "The notion of communication of geographic information through maps, found no support, did not succeed.". For this reason, it was proposed that the two concepts mentioned above, were merged into a single concept: **the information-communication**. However, there is still a supporter of the concept of communication, (Fraitag, Berlajant etc.) that put in its structure all processes and operations of thought and spatial recognition transformation from the creator of the map to its user (Freitag, 1992). Thus, **according to this framework, the concept of communication is considered as universal**. This is not right, since people think first and then act. Opinion has processes and specific operations that differ qualitatively from further operations and processes in the creation and use of maps. To the recent ones only a part is valid for communication (multiplication, storage, distribution); others (the study of the content of the map, the enactment of laws, etc.) entering the cognitive function of the map.

Linguistic concept (the language of maps), handled very well in the text of "Elements of Cartography" (Shehu & Nikolli, 2005), we consider as a priority. This concept was formulated in the 1960s (XX century) by Berten, Asllanikashvili ; Pravda, Volodčenko (1960s), Shlitman (19 80s), etc. and it has found increasing support ever since.

Linguistic concept expressed in cartographic literature with three options: (1) mapping language (1960s-70s of the century XX), (2) language mapping (1980s-90s) and (3) mapping symbols. The second option today is more theoretically developed and implemented in practice.

In addition, the concept of map language, mathematical cartography, metric maps, cartographic generalization are not included. Therefore, this concept is narrower than the concept of cartographic semiotics. **Cartographic semiotics** is a variant of the linguistic concept was established by Freitag, Volodčenko etc., in the 70s and 80s, and is based on the principles of semiotics (the science elements of signs and sign systems). According to this concept, the content of the map must pass four main stages: (1) mapping syntax, in which the ratios between cartographic signs are studied, (2) semantic mapping, in which the ratios between the marks and the content of the map are studied, (3) mapping sigmatic, in which the ratios between the signs and the respective laws real objects are studied, (4) pragmatics map, in which the ratios between the signs and maps users are studied.

However cartographic semiotics, as its proponents express themselves (Pravda, Schlichtman & Ėolodtschenko, 1994), theory of syntax, semiotics and mapping pragmatics are not yet well developed. On the other hand, the development of cartographic semiotics depends largely on the development of semiotics, what is insufficient.

Resettlement concept, formulated by J. Krho, in the years 1968, 1981, etc., rely on the fact that the object of mapping is geographical area, which consists of subsystem human sphere (anthropogenic) and natural sphere subsystem. According to this concept, the entire map files this geographical system through GIS. It is clear that cartography has too narrow connection with the science of geography, but in the field of cartography other systems are included as well. Therefore the concept of the system has a defined extension in cartography.

The **concept of modeling**, established by the publications of the following authors Zhukov - Serbenjuk - Tihonov, in the 1980s, is based on the opinion that the map represents a specific mathematical mapping model from which new models arise. So in this concept, everything is connected with the geometric accuracy of the contents of maps. However, geometric accuracy is not always associated with scientific accuracy. So, recently, anamorphic maps, required only scientific accuracy of the phenomena that occur in them.

Geoinformatic concept, is a variant of the processed information concept, established in the 90s from Berljan. According to this concept, all the theoretical concepts in cartography, converge in a single – geoinformatic concept, with the concept of communication as a base. But the reality is quite different: some ideas converge, others diverge, while other ideas are so far from each other that it is difficult to find common ratios. Therefore, this concept is biased.

2.3. Concepts on the map

We conclude that the right mapping definitions are those associated with the object and its product, map. The role and importance of maps is written in many scientific works and textbooks, of which deserves to quote two of them: (1) "People of the 2000s, and those who will come after, will need food in order to live, and this requires planning. Decisions to be taken without reference of topographic and thematic maps, would endanger life and harmony of states (ICA, 1994), and (2) "topographic maps in the past have been products as a result of high demand for military wars; thematic maps can be considered as a cartographic product for a different kind of war - the war against poverty, ignorance, disease and destruction of our environment "(Harley, 1990). The importance of maps is difficult to find a better definition than that of Harley.

In some works, given a very narrow sense, for instance, "Map is a conventional representation of geographical reality, representing selected elements and special features, as a result of the creative efforts of its authors intended to use, then, when the requirements to present spatial relations are primary "(ICA, 1994).

Simplicity and lack in defining the mapping as a term (in the case of the above quote (ICA, 1994), etc.), Explained by the fact that the maps represent not only objects and phenomena studied by geography (history, astronomy, hydrometeorology, geology etc.), not just those belonging to the "geographical study", etc., and not only those reports that have "geographic significance", "geographical thinking" etc. On the map presented objects and phenomena of nature, society and thought, and their laws, relying not only on consultation, e.g. the geography, but also with the knowledge (objects, phenomena, reports, features) other areas that have scientific and practical importance. In our opinion, a more universal definition and correctly on the map, has given Pravda (Pravda, 1994): "The map is a form of expression, expressive graphical method of spatial distribution of interrelated dependencies of the objects and phenomena of the world, known to man. It is the result of the recognition and, at the same time a source of knowledge. "Relying on this definition, we want to demonstrate that it is sufficient and appropriate to use the word "map", i.e. there is no need to put the suffixes "geographical". Not all maps come in a group of geographical maps.

One of the most important features of the map, which distinguishes it from other forms of presenting the reality is that its contents easily perceived, embedded in human memory, and is appropriate in its interaction with the thought process. But this fact does not mean that cartographic semiotics numerous problems can be solved with simple methods. On contrary, they are solved with difficulty and are quite complex. Republishing of cartographic signs books, on average every 5 years for topographic and thematic maps and their unification in the international system (led by UNESCO), etc., is clear evidence of progress mapping in general. In the article (Harley, 1990), the author writes: "Maps can be created and published much easier compared to the past and, in fact, almost universally. Maps are not just for cartographers' property. "While in other articles opposite opinions are expressed. **So, in summary form, in an article (Grosser, 1993) etc., stated: "The majority of published maps and analyzed worse - are the work (hand and mind) not cartography. So cartographers' participation in all mapping processes is more than necessary! And this is extremely important!". If Green (Green, 1993) thinks that the map "is drawn", he certainly is mistaken, as, indeed, the map "is created" only by creative work. Creation is not identified by drawing it.**

3. Conclusion

- Development and consolidation of theoretical cartography is of particular importance, because seriously affect the quality of cartographic materials production, reducing cost and increasing the amount of them. This conclusion is worth today, when maps and other cartographic materials are products of Geographic Information Systems (GIS).
- The Albanian cartographers have paid a special attention to theoretical studies in the field of cartography. Here we can mention the contribution of Prof. Agim Shehu in the field of scientific research, professional education of the history of cartography, closely related to the practical aspects of mapping, the contribution of Prof. Muharrem Cerabregu (Kosovo) in the field of vocational education and geography of historical cartography, etc.
- Currently concepts on maps and mapping are different. The authors of the paper do not support the concept of mapping information provided by many foreign authors, as it is a concept closely enough, that does not include the requirements of a wide spectrum of users. The concept of communication cannot be considered universal because people think first and then act. While the concept of linguistic (language mapping) is narrower than the concept of cartographic semiotics. Cartographic semiotics development depends largely on the development of semiotics, which is insufficient.
- Cartography should be considered a scientific discipline, since the content is mainly focused on scientific maps, while art, up to such an extent as to make the map more readable. Art needs science and techniques for the construction of works of art.
- A universal definition and correctly on the map, has given Pravda (Pravda, 1994): "The map is a form of expression, expressive graphical method of spatial distribution of interrelated dependencies of the objects and phenomena of the world, recognized by man. It is the result of the recognition and, at the same time a source of knowledge. Relying on this definition, we would like to say that it is sufficient and appropriate to use the word "map", i.e. there is no need to put the suffixes "geographical". Not all maps belong to a group of geographical maps.

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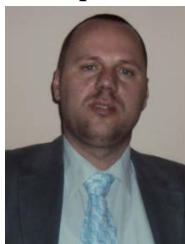
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Doctor of Sciences in cartography field. During this period, have taught the folloëing subjects: “Cartography” (for Geodesy and Geography students) and “Geodesy” (for Civil engineering & Geology students). Actually he is lecturer and tutor of the folloëing subjects: “Elements of Cartography” (for Geography students), GIS (for Geography students, diploma of first and second degree) “Interpretation of Arial Photographs” (for Geography students, diploma of first degree), “Satellite Images” (for geography students, diploma of second degree) “Thematic Cartography” (for Geography students, diploma of second degree) and “Topography-GIS (for the Geophysics students, diploma of second degree). Mr. Nikolli is the author and co-author 8 textbooks (Elements of Cartography and Topography, Elements of Cartography, Geographic Information Systems, Processing of satellite images, Cartography, etc), 3 monographs (History of Albanian Cartography, Mirdita on Geo-Cartographic vieë, etc), more than 40 scientific papers inside and outside of the country, more 40 scientific & popular papers, etc. Has participated in several post graduation courses of cartography and GIS outside of the country (1994, 2000 - Italy), etc.

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Bashkim IDRIZI, was born on 14.07.1974 in Skopje, Macedonia. He graduated in geodesy department of the Polytechnic University of Tirana-Albania in 1999 year. In 2004, he got the degree of master of sciences (MSc) in



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